



## Unit 1 Lesson 2

### Spin Cycle

Which is the smallest number?

**Think About It...**

$$1.25 \times 10^3 = 1,250 \quad 1.25 \times 10^{-3} = 0.00125$$

$$5.21 \times 10^3 = 5,210 \quad 5.21 \times 10^{-3} = 0.00521$$

Which is the largest number?

As each number is spun, write it in 1 of the boxes below.

#### Part 1

Create the **largest** possible value.

$$\square.\square\square\square \times 10^{\square}$$

#### Part 2

Create the **largest** possible value.

$$\square.\square\square\square \times 10^{-\square}$$

#### Part 3

Using the numbers 3, 5, 6, 7, and 8, fill in the boxes to create the **smallest** possible value.

$$\square.\square\square\square \times 10^{\square}$$

Using the numbers 3, 5, 6, 7, and 8, fill in the boxes to create the **smallest** possible value.

$$\square.\square\square\square \times 10^{-\square}$$

# Place Value and Scientific Notation

Complete the table.

Number	Ten-thousands	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths	Ten-thousandths	Scientific Notation
	$10^4$	$10^3$	$10^2$	$10^1$	$10^0$	$10^{-1}$	$10^{-2}$	$10^{-3}$	$10^{-4}$	
578			5	7	8					$5.78 \times 10^2$
0.0052					0	0	0	5	2	$5.2 \times 10^{-3}$
72										
										$5 \times 10^2$
0.0865										
										$1.53 \times 10^4$
6,230										
										$4.5 \times 10^{-2}$



# Unit 1 Lesson 2

## Independent Practice

A number written in scientific notation is the product of a power of 10 and a number greater than or equal to 1 and less than 10.

Place Value	Ten-thousands	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths	Ten-thousandths
Power of 10	$10^4$	$10^3$	$10^2$	$10^1$	$10^0$	$10^{-1}$	$10^{-2}$	$10^{-3}$	$10^{-4}$

### Example 1:

Write in scientific notation:

35,800

Place the decimal point between the first 2 nonzero numbers, 3 and 5.

Since the 3 was in the ten-thousands place, the power of 10 is  $10^4$ .

The number in scientific notation is  $3.58 \times 10^4$ .

### Example 2:

Write in scientific notation:

0.0082

Place the decimal point between the first 2 nonzero numbers, 8 and 2.

Since the 8 was in the thousandths place, the power of 10 is  $10^{-3}$ .

The number in scientific notation is  $8.2 \times 10^{-3}$ .

You can also count the number of times the decimal point moved to help you determine the power of 10.

$$35,800 = 3 \underbrace{5 \ 8 \ 0 \ 0}_{\text{decimal point moves 4 places to the left}} = 3.58 \times 10^4$$

$$0.0082 = 0.\underbrace{0 \ 0 \ 8 \ 2}_{\text{decimal point moves 3 places to the right}} = 8.2 \times 10^{-3}$$

To change a number from scientific notation into standard notation, begin with the place value indicated by the power of 10. Add zeros as place holders when necessary.

### Example 3:

Write in standard notation:

$2.54 \times 10^2$

Since  $10^2$  indicates the hundreds place, begin writing the number with the hundreds place.

The number in standard notation is 254.

### Example 4:

Write in standard notation:

$3.18 \times 10^{-3}$

Since  $10^{-3}$  indicates the thousandths place, begin writing the number with the thousandths place.

The number in standard notation is 0.00318.

You can also use the power of 10 to determine how many times to move the decimal point.

$$2.54 \times 10^2 = 2 \underbrace{. \ 5 \ 4}_{\text{move the decimal point 2 places to the right}} \times 10^2 = 254$$

$$3.18 \times 10^{-3} = \underbrace{0 \ 0 \ 3 \ . \ 1 \ 8}_{\text{move the decimal point 3 places to the left}} \times 10^{-3} = 0.00318$$



Write each number in scientific notation.

1 45,200

2 0.00265

3 0.014

4 1,800

5 100

6 0.001

Write each number in standard notation.

7  $1.25 \times 10^3$

8  $2.57 \times 10^{-2}$

9  $1.6 \times 10^{-1}$

10  $5.6 \times 10^1$

Solve each problem.

- 11 The age of the Earth is approximately 4,600,000,000 years old. How is this number written in scientific notation?
- 12 A radio station is giving away a prize worth  $1.5 \times 10^3$  dollars. How is this number written in standard notation?
- 13 A nanometer is 0.000000001 meters. How is this number written in scientific notation?
- 14 Star A is  $5 \times 10^7$  light years away. Star B is  $7 \times 10^5$  light years away. Which star is closer? Justify your answer.



## Unit 1 Lesson 2

### Scientifically Speaking

Kristin's science teacher wrote the following on the board.

The mass of Earth =  $597.42 \times 10^{22}$  kilograms.

Kristin claimed the number was not written in scientific notation. Who was correct, Kristen or her teacher? Justify your answer.



#### FOR TEACHER USE ONLY:

a. YES NO Student arrives at a correct solution?

	4	3	2	1
b. Conceptual Knowledge				
c. Procedural Knowledge				
d. Communication				



- 1 There are 9,710,000 web pages devoted to a Top 40 singer. How is this number written in scientific notation?
- A  $9.71 \times 10^4$   
B  $9.71 \times 10^5$   
C  $9.71 \times 10^6$   
D  $9.71 \times 10^7$
- 2 The diameter of a red blood cell is 0.00004 inch. How is this number written in scientific notation?
- A  $4 \times 10^{-5}$  inch  
B  $4 \times 10^{-4}$  inch  
C  $4 \times 10^4$  inch  
D  $4 \times 10^5$  inch
- 3 The Hoover Dam was built using 3,250,000 cubic yards of concrete. How is this number expressed in scientific notation?
- A  $325 \times 10^4$   
B  $32.5 \times 10^5$   
C  $3.25 \times 10^6$   
D  $0.325 \times 10^7$
- 4 Light can travel 1 meter in approximately 0.0000000033 second. How is 0.0000000033 written in scientific notation?
- A  $3.3 \times 10^9$   
B  $3.3 \times 10^{10}$   
C  $3.3 \times 10^{-10}$   
D  $3.3 \times 10^{-9}$